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# NAVAL POSTGRADUATE SCHOOL

## Monterey, California



# THESIS

AN ANALYSIS OF IMPEDIMENTS TO THE PRODUCTIVITY  
ENHANCING CAPITAL INVESTMENT PROGRAMS AT THE  
NAVAL AIR STATION, ALAMEDA AND THE NAVAL AIR  
REWORK FACILITY, ALAMEDA, CALIFORNIA

by

Carlos S. Badger

December 1985

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An Analysis of Impediments to the Productivity Enhancing  
Capital Investment Programs at the Naval Air Station, Alameda  
and the Naval Air Rework Facility, Alameda, California

by

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Submitted in partial fulfillment of the  
requirements for the degree of

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from the

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December 1985

## ABSTRACT

This thesis evaluates the impediments to the productivity enhancing capital investment programs to two Naval Activities, Naval Air Station Alameda, and Naval Air Rework Facility, Alameda, California. The analysis uses a management control perspective. Particular issues addressed are what productivity programs are currently being used and why some programs are not yet fully functioning. In examining the productivity programs it was found that certain barriers do exist that impede the full utilization of these programs. The work concludes with the listing of these impediments and recommendations for improving the programs.

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## I. INTRODUCTION

### A. BACKGROUND

Productivity enhancement is an expanding area of interest within the DoD and the government as a whole [Ref. 1: pp. 190]. Managers are increasingly being held accountable for coordinating the economic resources under their control in order to ensure their most efficient and effective use. In an effort to get the most productivity out of defense budget dollars, a more complete understanding of the total amount of needed capital investment expenditures is required. Determining how productivity programs are implemented by management through management control systems and the impediments to productivity that follow, can provide insight into how managers are motivated to seek or not to seek improved productivity through capital investment.

### B. RESEARCH QUESTIONS

#### 1. Primary Research Question

What are the impediments to productivity enhancing capital investment programs at Naval Air Station Alameda and Naval Air Rework Facility Alameda?

## 2. Subsidiary Research Question

What is the structure and process of the management control system for capital investment at Naval Air Station Alameda and Naval Air Rework Facility Alameda?

### C. RESEARCH METHODOLOGY

The research effort for this thesis relies primarily on three data sources. The first is a comprehensive review of available published literature on management control and productivity related topics in the form of books, periodicals, reports, and information obtained from the Defense Logistics Studies Information Exchange (DLSIE). The second method is personal interviews. These interviews were conducted on a one-on-one basis with personnel at different levels of management at NAS and NARF Alameda. Common to each interview was a standard questionnaire that was responded to orally by interviewees. The third data source is information gathered from archival data (e.g., instructions, memos) at each of the activities. This helped substantiate responses given by those interviewed and provided insight to guidelines established for each particular activity.

### D. SCOPE OF THE STUDY

The overall scope of this research effort was to provide an analysis from a management control system perspective of the productivity programs presently in effect at NAS and NARF Alameda. This analysis includes a description of both the

structure and process of the management control systems and the impediments to productivity found at the two activities.

#### E. LIMITATIONS OF THE STUDY

Given that this thesis focuses on productivity and capital investment issues, factors that are considered part of a manager's performance evaluation, it is understandable that interviews were somewhat guarded and non-attributable. The researcher attempted to get managers to be as open as possible and focus on concrete impediments that could be documented as opposed to everyday gripes.

#### F. ORGANIZATION OF THE STUDY

Chapter II provides a background of the DoD Productivity Program and the DON Productivity Improvement Program. Chapter III discusses the management control system (MCS) at NAS Alameda. A brief review of management control theory is also incorporated. Impediments to productivity at NAS Alameda is the subject of Chapter IV. Each phase of the management control system is evaluated for possible barriers that exist. In Chapter V, a brief profile of the recently implemented (FY 83) Asset Capitalization Program (ACP) at industrial funded activities is presented. This is followed by an analysis of the management control system at NARF Alameda as it functions within ACP. Productivity impediments



as they relate to each phase of the management control system at NARF Alameda are elaborated upon in Chapter VI. The study conclusions and recommendations are presented in Chapter VII.

## II. BACKGROUND

### A. INTRODUCTION

From the early 1900's when the work of Frederick W. Taylor, a pioneer in the methods of scientific management, was applied to efforts in our Navy shipyards, the government has sought to improve productivity in our defense resources [Ref. 2: pp. 5]. Since that time, many efforts at productivity improvements have begun, but in recent years, particularly the last decade, the need for productivity enhancement through capital investment has come to the forefront in government and defense planning. This chapter briefly addresses the events that have renewed our government's concern in this area and also discusses current programs that have been established in reaction to this concern. This background should provide a better understanding of the efforts, discussed in later chapters, of organizations at the lowest level within the Department of the Navy to comply with government directives for productivity improvement through capital investment.

### B. A NATIONAL CONCERN

Productivity is increasingly purported to be one of our critical national concerns. The House Committee on Armed Services has stated that even though the United States has

traditionally led the world in productivity, the United States is now last in productivity improvements among all industrialized nations [Ref. 3:pp. 16]. In fact, it is noted that the United States' continuing lead in productivity today stems from technological advancements and capital investments established in the 1950's and 60's [Ref. 1:pp. 190]. For example, a 1980 survey of metal cutting and forming equipment at DoD maintenance activities indicated that 60 percent of that machinery was at least two decades old [Ref. 4:pp. 19]. A serious downward trend during the 1970's in the rate of investment in productivity-enhancing modernization, particularly in defense-supporting industries, is also well documented [Ref. 1:pp. 190] and further aggregates the dilemma. The figures point to the fact that while our labor force productivity increased at the average annual rate of about 3 percent during the first two decades following WWII, during the 1970's it slowed markedly to about half that, or 1.5 percent a year [Ref. 5:pp 70]. During the same 10 year period, the productivity of Germany, Japan, and some other industrialized nations improved at rates of from 6 to 14 percent each year [Ref. 5:pp. 70]. The national defense implications for this deteriorating situation are a cause for concern.

In order to combat this slowdown and improve the annual rate of productivity, the government's most recent actions began in 1975 with the formation of the National Center for



Productivity and Quality of Working Life. The objectives of this center were in part to recommend ways of improving the rate of capital investments, stimulate and develop more effective approaches to improving productivity in the public sector, and coordinate the productivity-enhancing efforts of all Federal agencies [Ref. 5:pp. ii]. It was in response to required reports directed by this agency that DoD issued its own directive establishing its latest productivity program in August, 1975 [Ref. 6:pp. 10].

#### C. DoD PRODUCTIVITY PROGRAM

The DoD Productivity Program (DPP) was established with the issuance of DoD Directive 5010.31 in August of 1975. It was later updated in April of 1979. The three major aspects of the program were productivity enhancement, measurement, and evaluation [Ref. 4:pp. 20]. With these three elements in mind, DoD policy under the new program was to focus management attention on aggressively seeking out opportunities for improved methods of operation that would achieve maximum Defense outputs from available resource inputs. Any savings brought about by productivity enhancement would be reapplied, as much as practical, to the lowest organizational level as an incentive for management. It further provided that the DPP to be developed would include:

- (1) Productivity goals which would be made an integral part of the PPBS as well as resources to help achieve such goals;

- (2) A planned approach to productivity enhancement including;
  - (a) Continuing analysis, performance appraisal, and improvement of all operating methods and systems,
  - (b) Effective use of work measurement, statistical techniques to determine workforce efficiency, and development of data bases to support integration into PPBS,
  - (c) Productivity Enhancement Capital Investment Program development,
  - (d) Analysis of productivity enhancement alternatives in accordance with DoDI 7041.3, and
  - (e) Improvement through management efforts of workforce motivation and quality of working life. [Ref. 6:pp. 12-13]

The overall responsibility for implementing the program rests with the Assistant Secretary of Defense, Manpower, Reserve Affairs, and Logistics (ASD (MRA&L)). It is further delegated through a designated DoD Productivity Principal under ASD (MRA&L). The duties of that office include:

- (1) Overall DPP technical guidance,
- (2) Monitoring and coordinating productivity improvements within DoD,
- (3) Providing productivity data to other elements of the Federal government,
- (4) Providing DPP-related training curriculum guidance, and
- (5) Representing DoD in joint Federal government productivity enhancement efforts.

Additionally, the Assistant Secretary of Defense (Comptroller) was to ensure that all DPP efforts were appropriately integrated into current DoD resource management

systems. This would provide a means of accumulating productivity data and maintain economic analysis policy guidance. [Ref. 6:pp. 12]

Amplification of DoDD 5010.31 can be found in companion instructions DoDI 5010.34 and 5010.36. The 5010.34 instructions on the three major elements of the DPP; productivity enhancement, measurement, and evaluation. The 5010.36 establishes policy and prescribes procedures for the DoD Productivity Enhancing Capital Investment Program. Its objectives include:

- (1) Improve the efficiency and effectiveness of defense organizations and activities by encouraging the application of capital equipment and facilities to improve methods of operation.
- (2) Increase the level of consciousness among defense managers of the potential for productivity improvement through capital investments.
- (3) Promote the substitution of capital for labor as a means of optimizing the output of the defense work force.

Under the DoD instructions each component of DoD was required to implement its own productivity program in support of overall defense and government initiatives. The programs were to contain at least the following:

- (1) Priority emphasis on productivity enhancement,
- (2) Maximum use of existing resource management systems,
- (3) Methods improvement and labor performance standards use when appropriate,
- (4) Effective capital investment planning,

- (5) Development and use of productivity evaluation indicators,
- (6) Accumulation of productivity data,
- (7) Utilization of productivity and performance data in manpower requirements development,
- (8) Optimum effective use of standard time data,
- (9) Adequate staffing of the aproductivity program,
- (10) Periodic field reviews, and
- (11) Productivity measurement and evaluation. [Ref. 6:pp. 13]

#### D. DEPARTMENT OF THE NAVY PRODUCTIVITY IMPROVEMENT PROGRAM

Though criticized for being slow to get on line with a viable productivity program in comparison to the Army and Air Force [Ref. 7:pp. i], the Navy's current program promulgated in a Secretary of the Navy (SECNAV) Instruction 522.31A in June of 1981 establishes six program objectives to meet productivity enhancement needs in the Navy. These include:

- (1) Elevate visibility of productivity as an essential dimension of management within the Department of the Navy (DON);
- (2) Develop productivity enhancement initiatives as a means to achieve the highest possible level of readiness within available resources;
- (3) To stimulate managers, at all levels of organizations, to focus on the underlying mission of their organizations, to develop valid measures of output, and explore methodologies to improve organization performance;
- (4) To create a climate which will lead to the implementation of a well organized and economically sound productivity enhancing capital investment program;



- (5) To enhance the Quality of Working Life of the Navy's military and civilian workforce through the establishment of meaningful incentives and the elimination of disincentives to productivity; and
- (6) Foster the utilization of productivity data in program, budget, and performance evaluation.

The DON's policies under 5200.31A are similar to those established by DoD including the provision that savings which are derived from productivity enhancing initiatives would be, as much as practical, reapplied or used by the same activity accruing the savings.

Responsibilities for implementing the DON Productivity Program also corresponds to the DPP with DON counterparts of DoD fulfilling the same roles with much the same duties, (i.e., the Assistant Secretary of the Navy, (Shipbuilding and Logistics) has overall responsibility for the program). It is, however, the responsibility of all organizations within DON to take the following actions:

- (1) Take appropriate steps to promote productivity enhancement, measurement, and evaluation as an integral element of applicable management systems. The improvement of productivity is an inherent and continuing responsibility of all managers.
- (2) Develop and promulgate specific guidelines to subordinate commands to facilitate uniform and, to the extent practical, comprehensive productivity reporting at the individual major claimant or command level. In developing these guidelines, maximum use will be made of existing resource management systems.
- (3) Initiate action necessary to expand productivity measurement coverage to progressively encompass all susceptible support type and other functions.
- (4) Take appropriate steps to extend the identification of valid output indicators.



- (5) Ensure that a valid payback analysis data system and cost/benefit data base and analysis system are in place where productivity enhancing capital investment decisions are applicable.

In summary, this chapter has provided a background of the goals and strategy of the DoD and DON productivity programs. The major task of implementing strategy is to create a fit between the organization's goals and its other activities. Generally, these other activities include functional policies, the organization structure, processes, information systems, incentive systems, control systems, management selection and development, and leadership style. [Ref. 8:pp. 33] The following chapters will discuss the fit between the DON's goals to improve productivity through capital investment and the management control systems at Naval Air Station Alameda and Naval Air Rework Facility Alameda.

### III. MANAGEMENT CONTROL SYSTEM: NAS ALAMEDA

#### A. INTRODUCTION

The objectives of the Navy's productivity program are discussed in the previous chapter and represent the result of strategic planning to set goals for the Navy and various strategies to attain those goals. The strategies developed include both policies and broad programs of activities. When these decisions have been reached, though they may be re-examined continuously, management needs some way to assure that people in the organization do what they are supposed to do. Management control is the process by which managers assure that resources are obtained and used effectively and efficiently in the accomplishment of an organization's objectives. [Ref. 9:pp. 1] The system used to collect and analyze information, evaluate it, and use it and other devices to control activities is a management control system. [Ref. 10:pp. 4-5]

As is the case with any system within an organization, a management control system can be described in terms of: (a) its structure, and (b) its process; that is, what it is, and what it does [Ref. 9:pp. 21]. This chapter describes the management control system at NAS Alameda as it relates to promoting and obtaining funds for productivity improvements

through capital investment, an intrinsic element of the Navy's productivity program.

## B. STRUCTURE

Management control structure at NAS Alameda is primarily a responsibility structure. Under this type of structure the principal method of classifying data and management information is by responsibility centers. There are three types of responsibility centers: (1) cost centers, (2) revenue centers, and (3) investment centers. Information classified in this way is used for: (1) planning the activities of responsibility centers, (2) coordinating the work of the several responsibility centers in an organization, and (3) controlling the responsibility center manager. Responsibility costs are those incurred by or in behalf of a responsibility center. The total resources consumed by a responsibility center for a period of time, when measured in monetary terms, are the costs of that responsibility center. [Ref. 9:pp. 21-22, 26]

NAS Alameda is a fifth echelon command whose chain of command is shown in Figure A-1. The organization structure of NAS Alameda is depicted in Figure A-2. Ultimate responsibility for all programs, including productivity enhancement through capital investment, rests with the commanding officer. However, this responsibility is delegated to the department heads and special assistants who act as cost

center managers [Ref. 11:pp. 1]. Though each of these cost center managers answers directly to the commanding officer, all data collected for analysis are indirectly supplied to the commanding officer through the comptroller's department. This information, when received by the comptroller, is reviewed for validity and listed for comparison with the other departments. Though productivity information and enhancement is a common concern shared by each of the departments, there does not exist a productivity committee to coordinate these efforts.

### C. PROCESS

The management control process has two dimensions: (1) informal, and (2) formal. The informal management control process involves interaction among managers and workers as memos, meetings, conversations, and even such signals as facial expressions. The formal process in a management control system can be depicted as a closed loop, four phase process that recurs in a regular cycle as shown in Figure 1. [Ref. 10:pp. 26-27] This four phase process can also be used to describe the management control system at NAS Alameda.

#### 1. Program Selection

Productivity initiatives which deal with capital investment can originate at any level of the organization. These initiatives are generally passed up the chain of command to the department head level. It is important during

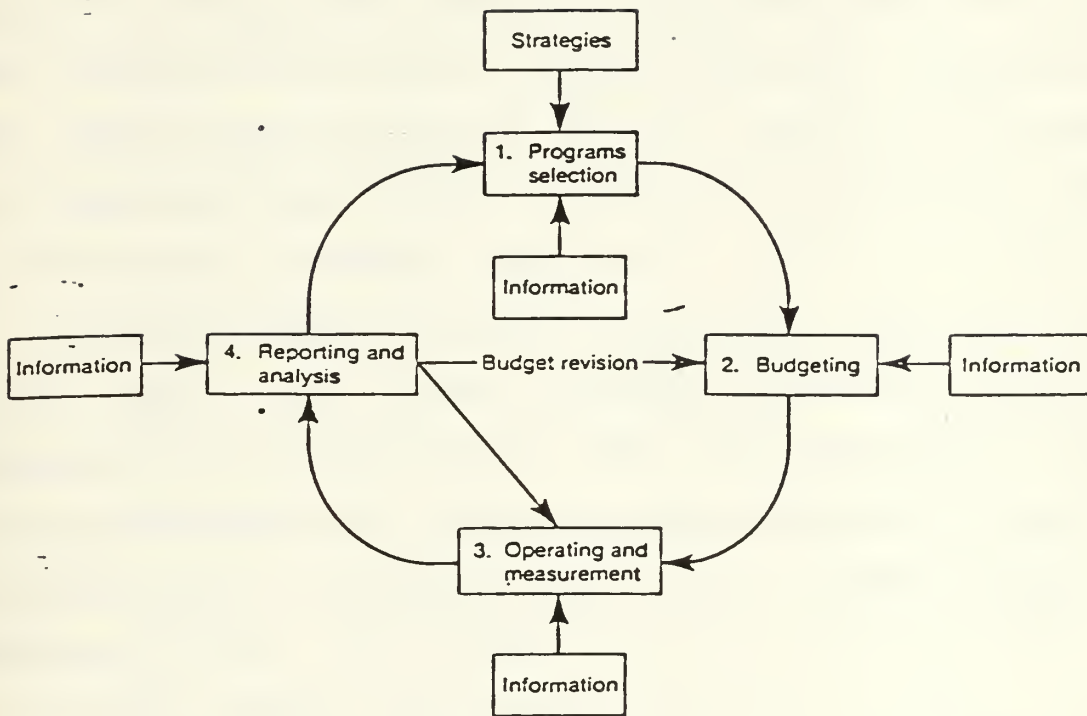


Figure 1.  
Phases of Management Control System



this process that productivity initiatives get sponsored. Managers up the chain of command must sponsor the project and shepherd it successfully through the rigors of whatever screening the department in question imposes. In fact the rate of progress of a project up the hierarchy of management through various stages of approval to final authorization and acceptance depends on the impetus given the project. [Ref. 12:pp. 57-58] By the time the project or program has reached the department head level it has gained some credibility through this screening process and the program selection process really begins. Programs that meet organizational goals and strategies are then formalized for submission to the commanding officer. These formal proposals are written to conform with instructions and guidelines promulgated by DoD and DON concerning equipment bought under funds entitled Other Procurement Navy (OPN), both industrial plant equipment (IPE) and equipment other than IPE. Each department submits a prioritized list of all such proposals to the comptroller's office for a final check for funding and regulation compliance prior to the commanding officer's review. This list is submitted annually in December/January time frame to comply with the Planning, Programming, Budgeting System (PPBS) deadlines. Lists submitted in December of 1984 would be funding requests for FY 87. [Ref. 12:pp. 1]

## 2. Budgeting

Budgeting now becomes an important factor in the program decision making. The commanding officer, normally assisted by the comptroller, will consider budget restraints and take into account planned increases and decreases in budget. These predictions are passed down to NAS Alameda from the major claimant (CLINCPACFLT) via the type commander (COMNAVAIRPAC). Though not done in the past, the comptroller would at this time also recommend possible program funding under PEGI/PIF of certain programs that might qualify for these funds. In the past, the type commander has reviewed OPN requests and returned some programs in order that they be used in seeking PEGI/PIF funding.

Once departmental needs have been aggregated and budgetary restraints considered, the commanding officer submits a consolidated, prioritized list to the major claimant via the type commander with PPBS. From these funds NAS Alameda receives money to enhance productivity through capital investment.

## 3. Operating and Measurement

Upon receipt of OPN dollars, the department heads and special assistants (cost center managers) purchase intended equipment and keep operating and measurement records of productivity improvement due to the new equipment in their respective centers. Should additional equipment be needed

during the fiscal year to improve productivity or meet mission requirements, emergent OPN dollars are normally requested. Emergent OPN dollars are OPN funds held on reserve at the major claimant level for emergency OPN equipment purchases. PECI/PIF funds which are available are seldom requested for productivity initiatives of this nature. [Ref. 11:pp. 1]

#### 4. Reporting and Analysis

The reporting and analysis of productivity enhancement through capital investment is accomplished by the departments sending cost and productivity data required by appropriate DoD and DON instruction to the comptroller first, then the commanding officer for review. It is then sent up the chain of command via the type commander to the major claimant. This is a requirement that has to be completed for a specified period referred to as the payback period [Ref. 13:pp. 1-3]. After that, similar data are not kept. Reports of equipment previously requested but not yet funded as well as the equipment failing to meet productivity levels used to justify its purchase are communicated and used for revision of future budget requests and operations data. [Ref. 11:pp. 1]

Not incorporated in this four phase model, but also a management tool for promoting increased productivity at NAS Alameda and throughout the government, is the beneficial suggestion program. Cash awards are given to both military and

civilians who present ideas that improve the efficiency and effectiveness of government operations. It should be noted that these suggestions need not improve the awardees' particular job per se, but only relate to their official duties. The program is administered by one person appointed by the commanding officer. It is the responsibility of all managers to promote the program. Suggestions are evaluated for merit by anyone determined to have sufficient expertise, including a suggestor's supervisor or department head. These evaluators determine the costs, benefits, and advisability of adopting and implementing a beneficial suggestion. [Ref. 14:pp. 1-5]

In conclusion, meaningful strategies must be conceived in operational terms, such as markets to reach, materials to acquire, research to perform, and the like [Ref. 15:pp. 30]. So it is with a productivity enhancement strategy. In this chapter, both the structure and process of the management control system at NAS Alameda have been described. This management control system which promotes productivity and obtains funds for productivity improvements through capital investment has been established to follow directives set by higher authority and function within the bounds of PPBS. This action integrates the system with many aspects of the DoD and DON productivity programs. However, such actions take on value only as they contribute to the desired results. It is now necessary to determine if there are any barriers

that impede the management control system to produce these desired results.



#### IV. IMPEDIMENTS TO THE PRODUCTIVITY PROGRAM AT NAS ALAMEDA

##### A. INTRODUCTION

In Chapter III the productivity program at NAS Alameda is discussed using a four phase MCS model. In this chapter this same MCS model (i.e., program selection, budgeting, operating and measurement, reporting and analysis) is used to evaluate the possible areas where impediments may exist within the productivity program at NAS Alameda.

##### B. PROGRAM SELECTION

Productivity initiatives for program selection can be submitted from any level of management within a department. These ideas are screened partially by supervisors as they are routed up the department chain of command prior to being formally submitted by the department to the comptroller for budget submission. Those interviewed said they believed this process was not restrictive as virtually all suggestions for productivity enhancements were included in the departmental budget submissions. Therefore, this screening process is determined not to be a probable impediment to productivity.

One of the impediments to productivity during this phase of MCS was a need for department training in the availability of other funds for use in procuring equipment for productivity enhancement. The lack of requests for funds other than

OPN from the various departments reflects this need. Departments are only required to submit lists of equipment needed under OPN. In fact, except for the comptroller and two budget analysts in the comptroller's office, programs such as the PEGI/PIF are virtually unknown to department planners. Recently, one department did investigate and seek PEGI funds on its own initiative and received tentative approval. The implication is that if more departments were trained to recognize potential projects that would qualify for these funds, utilization of the funds would increase.

The absence of a productivity committee poses another possible impediment to productivity at NAS Alameda. The burden of evaluating projects and prioritizing them for the entire base is placed on the expertise of the commanding officer, assisted by the comptroller. The department heads have access to the commanding officer to advise him of the merits of their own particular projects. However, it was said by those interviewed that under the present system in some cases "politics" played too great a role and it was the "squeaky wheel that got the grease." In addition, it was expressed by those interviewed that they did not know entirely what capital investments were procured in other departments or whether these procurements could be used to improve productivity in their departments. Productivity committees are established to coordinate and handle these situations.

Many times programs are adopted because they are directed by higher authority. An example would be a recent procurement of a munitions loader. After an inspection by the type commander's (COMNAVAIRPAC) safety and assistance team, it was determined that the current munitions loader was unsafe and posed a hazard to the weapons personnel. To comply with a new directive, the new munitions loader became a top priority. Additionally, an x-ray security screening system for inspecting baggage at the air terminal was purchased because of a manpower reduction of five baggage inspectors. This manpower reduction, directed by higher authority, literally forced the procurement of the x-ray system, if the security of the air terminal was still to be maintained. While these purchases certainly contribute to the safety and efficiency of operations, they also demonstrate how directives from higher authority affect the decisions at the activity level. It may have been more productive for NAS Alameda to have kept the five inspectors and purchased a piece of equipment for another department which would have produced greater cost savings. However, the flexibility to do so has been removed by decisions from higher authority.

#### C. BUDGETING

The adequacy of funding of OPN budgets has impeded the use of other funding sources for capital investments. During

the last four or five years under the current administration the defense department has enjoyed budget increases not seen in many years [Ref. 16]. Because of this, it was expressed by those persons interviewed that their current budget allocations and funding were adequate and met most of their department needs. The adequacy of their budgets perhaps contributes to the lack of aggressiveness in seeking additional funds from other sources, such as PEGI/PIF, for programs requested but not funded under OPN. Managers may honestly fail to see the need for change from present budget strategy.

Another impediment is the false impression held by the budget office that PEGI/PIF program submission decisions were under the direction of higher authority and not at local discretion. In the past, some programs for equipment that were originally submitted up the chain of command during the annual OPN requests were then returned to the originator with instructions that they be resubmitted as PEGI/PIF programs. This is the case with the programs submitted by NAS Alameda for PEGI/PIF funding. They were originally submitted as OPN requests, but were returned with instructions to resubmit as PEGI/PIF. For the last three years only one program per year has been submitted. Prior to 1982 there were no recorded submissions. Additionally, according to a memorandum from COMNAVAIRPAC, for FY-1984 there were only 12 programs submitted for the entire U.S. Navy, of which only nine were

funded [Ref. 17:pp. 1-3]. Because there are so few submissions and the submissions on record at NAS Alameda were at the suggestion of COMNAVAIRPAC, it was misleadingly understood that PEGI/PIF projects were the product of directives from higher authority.

Lack of training of personnel submitting requests for alternate methods of funding productivity enhancing capital investments is another impediment found in this phase of the MCS. When department lists of prioritized OPN requests were received by the comptroller's office, they were then scrutinized to determine if alternate funding, other than OPN, was appropriate. Worksheets showed that some were reassigned legitimately for funds available in such areas as morale, welfare, and recreation, while others were separated into IPE and other than IPE. However, none were selected for PEGI/PIF funding. Those interviewed said that part of the problem is that personnel within the comptroller's office were not familiar with the actual mechanics of submitting PEGI/PIF projects. Training and the use of the instruction regarding PEGI/PIF was almost nonexistent. Only one person in the comptroller's office was familiar with the PEGI/PIF instruction. This person had prepared the submission for the project last year and was working jointly with a budget analyst from another department for a project being submitted for FY 85. However, she expressed apprehension in preparing PEGI/PIF submissions. She said last year's document preparation took



two months to complete. This year's PIF submission was returned for clarification, additional information, so that it could be brought into compliance with current regulations [Ref. 18:pp. 1]. Because of this difficulty, coupled with the fact that the comptroller's office normally decides the funding channels, it is understandable why past PEGI/PIF programs were submitted only when directed by higher authority.

A by-product of this process of submitting first under OPN and then resubmitting under alternate funding programs is a time lag. Projects have a two to three year additional time lag from program conception to actual funding and procurement [Ref. 19].

#### D. OPERATING AND MEASUREMENT

One of the impediments found in this phase of MCS is the loss of expertise due to the on-going problem of personnel turnover. Though they had been in their field of work for several years, 80 percent of those interviewed had only been in their present jobs for one year or less. This same percentage said they felt they were just starting to get the feel of their new positions and could consequently now concern themselves more with productivity matters. Two to three year personnel turnover in the military is a common occurrence and often causes reliance on proven programs and experience [Ref. 19]. New programs such as the PEGI/PIF are

often ignored until a convenient time when managers can acquaint themselves with it. A convenient time, with the normally burdensome workload of the managers, does not often occur and consequently, some new programs get shelved within the system [Ref. 19].

Another impediment is that office equipment and some of the high tech machines have very short useful lives. This makes it difficult for managers to work within PPBS, that is, request funds and receive them, and still have the useful life that had been originally projected for the equipment. NAS Alameda had at least one case where they bought two pieces of office equipment which became obsolete within the first two years of operation. The obsolescence precluded a cost saving even though every attempt was made to generate a reportable savings [Ref. 20:pp. 1].

#### E. REPORTING AND ANALYSIS

The absence of a productivity committee at NAS Alameda can also be listed as an impediment during this final phase of the MCS model.

Managers attend to items that they know are being measured, particularly if they have to report to higher management on those items. Because of the natural tendency to want to "look good," meeting the goals of the reporting system can be a goal in itself, even if meeting that goal acts to the general detriment of the rest of the system. Supervisors and managers cannot be expected to act counter to their own interests . . . [Ref. 21:pp. 1]

The absence of a productivity committee at NAS Alameda more readily provides the opportunity for departments to act

individually rather than in a coordinated effort. Those interviewed said a productivity committee would be beneficial and feedback on productivity programs and equipment would be improved.

In summary, while these are not all the possible impediments, barriers to productivity do exist within the MCS at NAS Alameda. These impediments or barriers can and often do hamper implementation of productivity programs. The success of productivity programs such as PEFI/PIF can be severely restrained if these impediments are not overcome within the system.

## V. MANAGEMENT CONTROL SYSTEM: NARF ALAMEDA

### A. INTRODUCTION

The Naval Air Rework Facility (NARF), Alameda is an industrial fund activity. On 19 August 1981, the Deputy Secretary of Defense approved the financing of equipment and minor construction for industrial fund activities with industrial fund resources [Ref. 22:pp. 1]. This meant that industrial fund equipment would be acquired with industrial fund revenues rather than direct appropriated funds. The effective date for the change was 1 October 1982. The program established to implement this policy was the Asset Capitalization Program (ACP). The program includes, but is not limited to, investments in capital equipment, minor construction, and management systems development efforts. Under ACP, equipment with unit acquisition costs of \$1,000 or more and a useful life of more than two years must be capitalized and depreciated. This includes modification and upgrading that would extend the useful life of the equipment by more than two years or increase the equipment's work performance capacity and capabilities. Management systems development includes both the cost of acquisition and the development of software which exceeds \$100,000 and has a useful life of more than two years. Equipment and management systems whose costs and useful lives are outside these parameters are expensed in

full, with some exceptions, during the current fiscal year. Minor construction projects in support of industrial fund operations which cost less than \$100,000 are also included in this program. Construction costing over \$100,000 is funded through Congressional appropriations. [Ref. 22:pp. 4]

Industrial fund activities receive their revenue to purchase equipment from the stabilized rates they charge their customers. These rates are based on projected costs including depreciation on all capital investment items exclusive of contributed real property, and accumulated operating results (gain/loss) due to prior year operations to be distributed to customers via a payback factor. Additionally, adjustments in the form of reserves are held to assure sufficient cash to meet operational requirements. Reserve amounts may be collected in the current year to help finance periodic or extraordinary expenses of future years. The types of reserves to be collected are capital equipment purchases, backlog of major maintenance and repairs (real and plant property), minor construction, cash level requirements (30 days average), management software systems development efforts, and other (i.e., revenues required to finance high costs of dredging a channel every five years may be collected over the preceding five year period rather than in the year of dredging the channel). The development of the stabilized rates include all these factors as applicable. [Ref. 22:pp 5].



With this brief and limited explanation of ACP as background, the balance of this chapter describes the control system for productivity through capital investment, both the structure and process, that management at NARF Alameda uses as it functions within ACP.

## B. STRUCTURE

The management control structure at NARF Alameda is that of a responsibility structure. The principal method of classifying data and management information is by department. Responsibility costs are assigned as they are incurred by or in behalf of the departments. Each department head acts as a cost center manager and answers directly to the Commanding Officer. NARF Alameda is a fourth echelon command whose chain of command is shown in Figure A-3. The organization structure of NARF Alameda is shown in Figure A-4.

## C. PROCESS

### 1. Program Selection

The objectives of the ACP program at NARF Alameda are to: (1) equip construction facilities, (2) replace aged equipment, (3) increase productivity through new technology, (4) support increased workload, and (5) meet safety and environmental requirements [Ref. 23:pp. 2]. These objectives parallel objectives set by the Naval Aviation Logistics Center (NALC) who acts as the head of the Naval Air Rework

Facility Activity Group. In this capacity NALC has the responsibility of formulating a five year comprehensive equipment funding plan for all the NARF's [Ref. 22:pp 2]. It accomplishes this through a NARF Modernization Program which NALC sponsors and coordinates throughout the activity group. This strategy is the basis for program selection at NARF Alameda.

The actual process for program selection of productivity enhancing capital investments begins with a request from any level of management at the NARF. These requests are first sent to the production engineering department. At that time an evaluation of the investment is performed and such things as man-hour savings, compatibility to plant layout, and environmental impact are considered. Investments that will produce a cost savings after evaluation by the engineering department are then forwarded to the production steering committee. This committee acts as a productivity enhancement committee and evaluates the overall reasonableness of the investment. The main criterion for program selection at this point is whether the investment fits into the objectives and budget limits of the NARF. If it does, then it becomes part of a prioritized capital equipment budget, sanctioned by the Commanding Officer, and submitted up the chain of command to NALC to be part of the five year comprehensive equipment funding plan.

## 2. Budgeting

Each industrial funded activity group must prepare and submit a Capital Equipment Budget (CEB) annually. The purpose of this CEB is to present a proposed equipment acquisition and funding plan for the budget year which is divided into target obligations and target outlays (expenses). The target obligations are for the equipments listed in the activity group five year comprehensive funding plan. The target outlays are those things which will affect cash flow for the budget year and out years. They have an impact on future depreciation costs, the acquisition financing factor, and the computation of the stabilized rates. [Ref. 22:pp. 3]

NARF Alameda submits its annual CEB to NALC, who in turn submits the comprehensive CEB for the activity group to the Comptroller of the Navy (NAVCOMPT). NARF Alameda's CEB is a prioritized list based on forecasted funding. Budgeted funding for equipment under the ACP program since its implementation at NARF Alameda has been between 1 percent to 2 percent of sales revenue. This is approximately \$2 million in FY 83 and \$15 million in FY 85. Projected funding through 1990 will be near \$17 million annually [Ref. 23:pp 3].

## 3. Operating and Measurement

Productivity enhancing capital investment projects adopted for use at NARF Alameda are assigned executive program managers, normally one from NAVAIRSYSCOM and one from

the NALC who follow its progress. In addition, a composite project coordinator is named if the project can be used by other activity groups, and a project managing agency is selected. The latter is usually the activity where the project originated and is responsible for data gathering. Systems integrating contractors and technical consultants may also be listed to provide additional expertise. The division of primary responsibilities (i.e., project overview, technical review, and fiscal review) is normally divided between the executive program managers and the managing agency. [Ref. 24:pp. 11]

Each project is then given an event sequence that details each phase of implementation. Expenditure tracking schemes and payback measurements are also provided so that needed data are gathered throughout the whole operating process. [Ref. 24:pp. 17-19]

#### 4. Reporting and Analysis

Most payback tracking and data information are based on the master data record system of work sequencing presently used at all NARF's. Information on each project is provided quarterly to the project managing agency and the executive program managers. [Ref. 24:pp. 20] In addition, as situations and needs change the CEB is updated and revised throughout the year.

In summary, the ACP program has given NARF Alameda a detailed program for funding of capital investments. Functioning within the MCS the ACP theoretically provides the implementation process necessary for a successful productivity program through capital investments. However, impediments to productivity do exist within this system and are evaluated in the next chapter.



## VI. IMPEDIMENTS TO THE PRODUCTIVITY PROGRAM AT NARF ALAMEDA

### A. INTRODUCTION

The Office of the Secretary of Defense stated that it intended the ACP to provide greatly increased funds for equipment acquisition at DoD industrially funded activities. Associated with these additional revenues is a mandate to enhance productivity through equipment modernization [Ref. 22:pp. 1] The MCS for the effective implementation of an equipment modernization effort at NARF Alameda is discussed in the previous chapter. The same four phases of MCS, that is, program selection, budgeting, operating and measurement, reporting and analysis, are used in this chapter to discuss areas where possible impediments exist to the productivity program at NARF Alameda.

### B. PROGRAM SELECTION

Much of the program selection at NARF Alameda is received from higher authority. These programs originate from staffs and organizations outside the NARF line management chain who are not directly responsible for managing and executing the program [Ref. 25]. Though this is not necessarily an impediment, it does prescribe some limits on the flexibility of the NARF management [Ref. 25].

One of the impediments to productivity during this phase of MCS is the method of screening programs. While ideas for increased productivity through capital investment can originate at any level of the organization [Ref. 25], what matters is if they end up in the equipment budget. Criteria for being selected for this prioritized list not only include whether or not the project is a cost saver, but also the selected item must fit into the goals of production for that fiscal year [Ref. 25]. Programs that would be excellent cost savers in, for example, the administration department, would be listed below programs viewed as critical in the production divisions [Ref. 25]. Even from one production division to another, those interviewed said they felt that there were certain divisions which were much more privileged in receiving funds than others. In those divisions where funding was withheld, the supervisors stated they felt frustrated due to the fact that they had to wait indefinitely on projects that would be great productivity boosters in their shops [Ref. 25]. According to those same supervisors, it was doubtful whether some of their projects would ever make it up the priority list high enough to get funded [Ref. 25]. While those interviewed said they felt it unreasonable to assume all cost saving projects should or will get funded, the idea that only certain divisions do get funding was said to be discouraging to them.

### C. BUDGETING

An impediment found initially to exist in this phase of MCS was that funds generated did not fully finance capital equipment budgeted for that fiscal year [Ref. 26]. Insufficient funds for use in capital investment was largely due to the start up of the ACP program [Ref. 26]. Under ACP, equipment for industrial funded activities would be procured from operating budgets rather than by use of appropriated funds. The cost of equipment purchased is to be recovered through rates charged to industrial fund customers. At NARF Alameda the budget amount is 1 percent to 2 percent of sales revenues.

When NARF Alameda switched over to ACP in FY 83, it was the opinion of one of the assistant comptrollers that the budget analysts were not sufficiently prepared to deal with the new program [Ref. 26]. Subsequently, in working with the new rates and the factors that go into those rates, revenues generated did not come close to budgeted amounts reserved for capital expenditures. Less than \$2 million in revenue was realized for the approximately \$8 million in the capital equipment budget. Things improved but were not much better in FY 84. It was not until FY 85 that revenues and budgets for capital equipment were on track and meeting the expectations of management. [Ref. 23:pp. 3]

Another impediment was the lack of knowledge of other available funds. From 1 October 1982, when ACP began, until

the summer of 1985, NARF Alameda relied solely on funding productivity enhancing capital investments through ACP. This was done because the original instruction (NAVCOMPTINST 7600.27) forbade the use of other funds. It stated:

The Industrial Fund Fast Payback program will cease on 30 September 1982. Participation by Industrial Funds in other OSD or Service productivity investment programs not financed by Industrial Fund revenues will also cease on 30 September 1982. Equipment ordered in FY 1982 and prior years through fast payback and other programs, will be accepted on delivery and paid for as budgeted. [Ref. 22:pp. 4]

However, certain aspects of productivity investment programs were not to be discontinued by industrial fund activities. In a memorandum dated 24 March 1982 from the Assistant Secretary of Defense for Manpower, Reserve Affairs, and Logistics, the eligibility of projects from industrially funded activities for PIF funds was explained as follows:

In future years, projects at industrially funded activities will be eligible for PIF under the following special conditions:

a. Military Construction requirements for productivity enhancing projects. (Selections will be based on the basis of total project costs.)

b. Projects for major equipment in the Range and Test Facilities Base.

c. Demonstration projects, prototype projects, multi-function/multi-service projects or other exception projects as jointly approved by ASD(C) and ASD(MRA&L).

d. Equipment for tenant activities, military support functions and other activities of Industrial Funds even though they utilize Industrial Fund financial systems. [Ref. 27:pp. 3]

NARF Alameda did not receive word of this modification and consequently did not submit any PIF projects. Information about PIF eligibility was passed informally among the NARF

comptrollers at a conference in summer of 1985. Currently there are efforts underway to submit PIF projects. [Ref. 25]

Additionally, Navy Sponsored Productivity Investments in Cost of Ownership Reduction Investment (COORI) are now being utilized. COORI funds are referred to as Component Sponsored Investments (CSI) funds in DoD instructions [Ref. 28:pp. 5]. COORI funds are used for investments in facilities, equipment, procedures, and specific planning to improve the operational capabilities of the fleet and its supporting activities and to reduce the cost of ownership of materials used therein. Projects have to satisfy a current or anticipated Navy requirement for which new equipment, procedures, or technology will provide increased productivity. COORI projects are competitively selected throughout the Navy. There are no specific qualification limits, but a \$3000 minimum and a \$100,000 practical minimum are normally observed on COORI projects. Projects should be amortized within five years of installation.

#### D. OPERATING AND MEASUREMENT

In 1978, a conference on "Productivity and Work Motivation in the Navy and Other Military Services" listed lack of adequate capital investment as one of the important impediments to productivity [Ref. 21:pp. 3]. At NARF Alameda 87 percent of those interviewed stated that the majority of the more costly equipment in their respective shops was between



20 and 30 years old. When asked what factor would improve productivity the most in their shops, 75 percent of those interviewed said new equipment while 25 percent listed training and supplies. All of those interviewed had equipment identified for their shops that would reduce man-hours and machine downtime which were their two greatest costs. [Ref. 25]

Additionally, when asked what was done to improve productivity when needed to meet production deadlines, given new equipment was not available, all stated that to remain within budgets the first step usually taken was to seek a lowering of standards. Standards are statements of the manner and quality of the work being performed. This parallels a previous study which states:

Workers and foremen perceive standards as being too tight because of the following reasons:

1. Components and aircraft entering NARF for repair are in such poor condition that more time is required than previously estimated to make repairs.

2. Much of the shop equipment is obsolete and in poor condition.

3. Skill levels of production workers have declined, and NARF training programs have not been adequate to compensate for this decline.

Both workers and foremen perceive failure to meet production standards as unacceptable performance. Rather than report such failure, they take steps to evade the standard. . . . The NARF management has been unable to eliminate the practice of evading standards without increasing the number of support personnel and/or adversely affecting essential production functions. [Ref. 21:pp. 42]

To design productivity into a system, such as the standards system, requires consideration of certain concepts. One of these concepts is that production cannot be achieved at

the cost of quality. It is a common error to maximize productivity without at the same time maximizing quality. The productivity attained with a loss of quality is not useful. [Ref. 6:pp. 59]

With a projected workload increase of over 31 percent at the NARF's during the next 10 years, operating with less than adequate equipment could harply affect standards and productivity [Ref. 29:pp. 1].

#### E. REPORTING AND ANALYSIS

Capital equipment funding procedures, including justification and economic analysis, must be adequately documented at the activity level to ensure that post-investment appraisal and audit can be performed [Ref. 11:pp. 4]. However, poor implementation of standards at the NARF has resulted in documented management and cost data being distorted. Such practices as reporting jobs not actually performed and transferring time from an efficient worker to an inefficient worker are examples of past distortions. To the extent that this distortion degrades management decision making, future productivity will be impeded. [Ref. 21:pp. 42]

In summary, the management control system, though functioning under ACP, has had several impediments to productivity and capital investment. The impediments listed in this chapter may not be all the impediments to productivity at

NARF Alameda, they are, however, the ones identified as part of this research project.

## VII. CONCLUSIONS AND RECOMMENDATIONS

### A. INTRODUCTION

The productivity programs established by DoD and DON have provided the strategy for the productivity programs at NAS Alameda and NARF Alameda. The management control systems at these two activities are the means by which this strategy is implemented. In Chapters III and V these management control systems for promoting and obtaining funds to improve productivity through capital investments are described. In Chapters IV and VI the impediments to productivity found within the management control systems at the two activities are discussed. It is this aspect, the impediments to productivity that the following conclusions and recommendations are directed.

### B. CONCLUSIONS

The impediments to productivity listed in Chapter IV which are found within the management control system at NAS Alameda are:

- (1) Lack of training in certain productivity programs.
- (2) Absence of a productivity committee.
- (3) Feeling of inadequacy in present budgets.
- (4) Time lags between equipment requests and actual procurement.

(5) Program flexibility loss due to directives from higher authority.

(6) Loss of expertise due to high personnel turnover.

Chapter VI listed the following impediments to productivity within the management control system at NARF Alameda:

(1) Program screening process.

(2) Insufficient funding during changeover to ACP.

(3) Lack of training in certain productivity programs.

(4) Lack of adequate capital investment.

(5) Poor implementation of standards.

It can be concluded that while these may not be all the impediments to productivity at these activities, these lists provide some areas where barriers to productivity exist. The correction of these impediments will require coordination of management from both within the organizations and up the chain of command.

#### C. RECOMMENDATIONS

The coordination of management from within and without the organization can be demonstrated by the following two recommendations. First, the formation of a committee to analyze the impact of these impediments and suggest corrective actions is recommended for both activities. Representatives from each department on such a committee would improve coordination of productivity efforts. According to management theory, committees offer certain advantages. Among these



advantages are: (1) committees tend to check more and reject errors more often than individuals because of the greater number of perspectives and inputs which they can muster, (2) committee-member interaction is capable of stimulating new thoughts and ideas, (3) commitments to private prejudices may be reduced, and (4) committees can change individual knowledge and skill through direct tuition, feedback, and modeling [Ref. 30:pp. 147]. The production steering committee at NARF Alameda could easily function in this capacity. In the case of NAS Alameda where there is an absence of a productivity committee, a new committee will need to be formed.

Second, an impediment common to both NAS Alameda and NARF Alameda is the lack of training in certain productivity enhancement programs which make funds available for capital investments. Training is part of the information flow in the management control system [Ref. 10:pp. 27]. Productivity programs such as PEGI/PIF were not very well understood and rarely utilized. Some of the reasons why this is so surfaced while interviewing at the activities. They were: (1) confusion on eligibility for funds, (2) difficulty in properly submitting funding requests, and (3) lack of awareness of the program's existence. All these problems reflect a need for additional training. [Ref. 31]

It is recommended that agencies in charge of these programs (e.g., for PEGI/PIF the Defense Productivity Program

Office (DPPO)) evaluate their training programs or the training programs of the component services. Emphasis during the evaluation should be placed on how far down the chain of command effective training is being accomplished, and then steps should be taken to provide what is necessary so that adequate training is received all the way down to the activity level.

In summary, the focus of this thesis has been an analysis of the management control systems (MCS) as they relate to productivity enhancing capital investments at NAS Alameda and NARF Alameda. It was determined that impediments and barriers existed that affected the successful implementation of certain productivity programs within these two activities. Solutions to these impediments can be found through a more carefully coordinated, comprehensive effort from both within and without the organizations of NAS Alameda and NARF Alameda.

APPENDIX A

ORGANIZATIONAL FIGURES

CHAIN OF COMMAND FOR NAS ALAMEDA

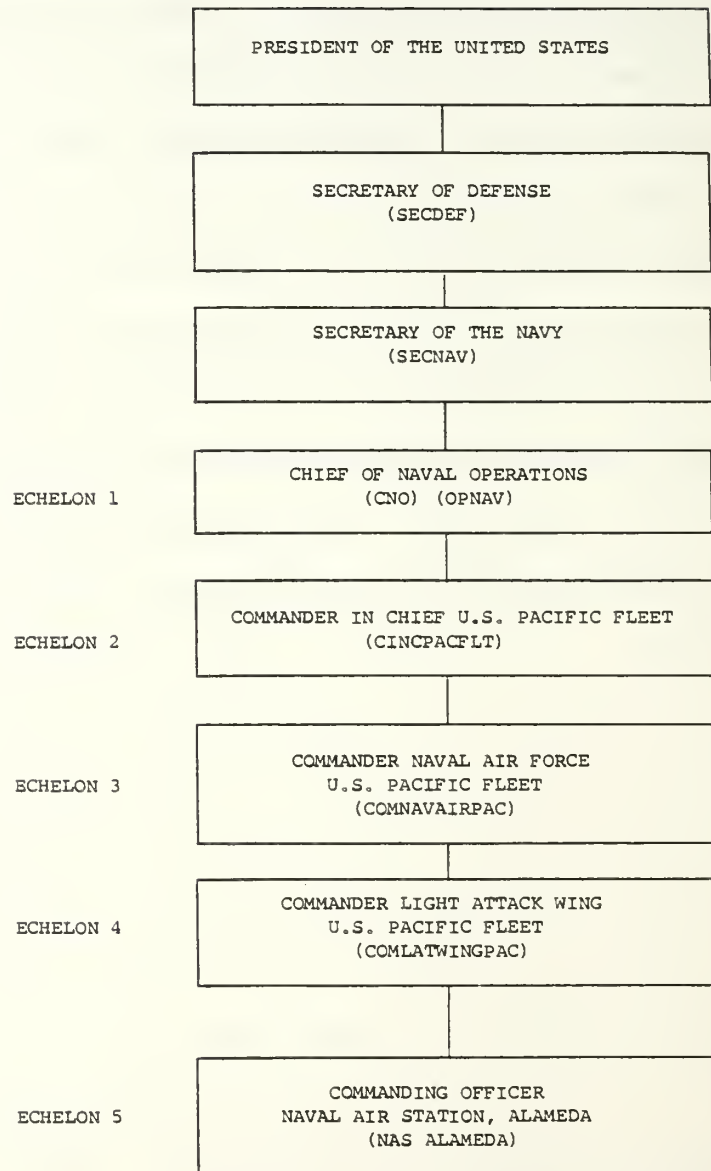


Figure A-1

Chain of Command NAS Alameda

ORGANIZATION CHART NAS ALAMEDA

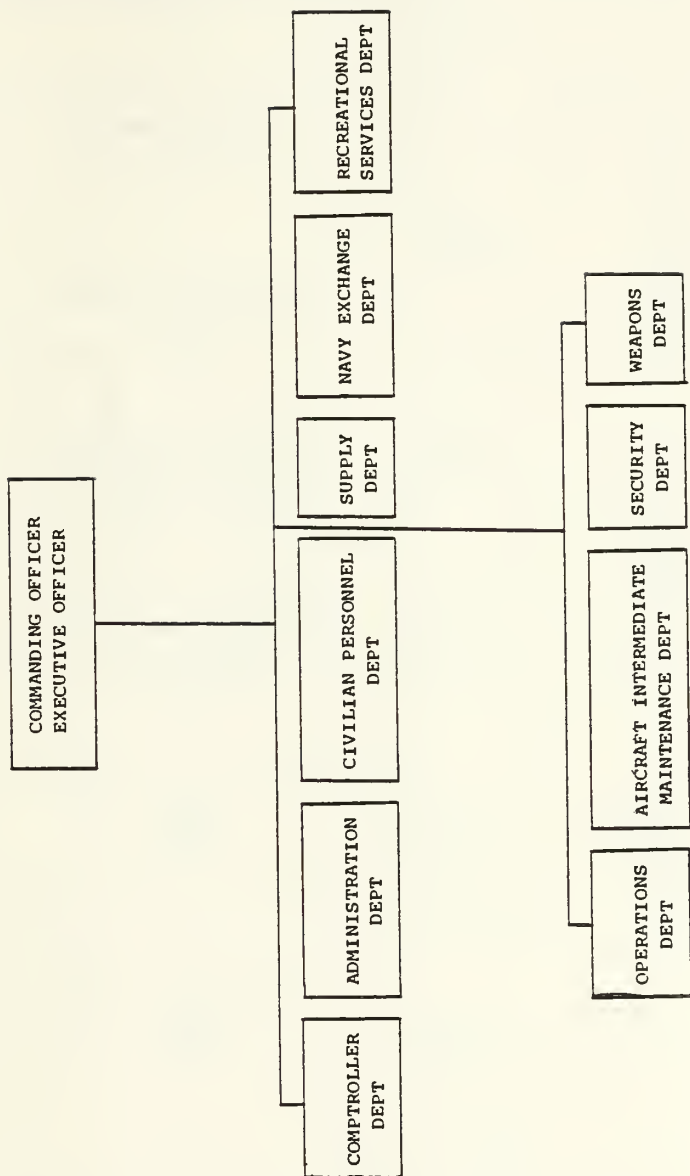


Figure A-2

Organization Chart NAS Alameda

CHAIN OF COMMAND NARF ALAMEDA

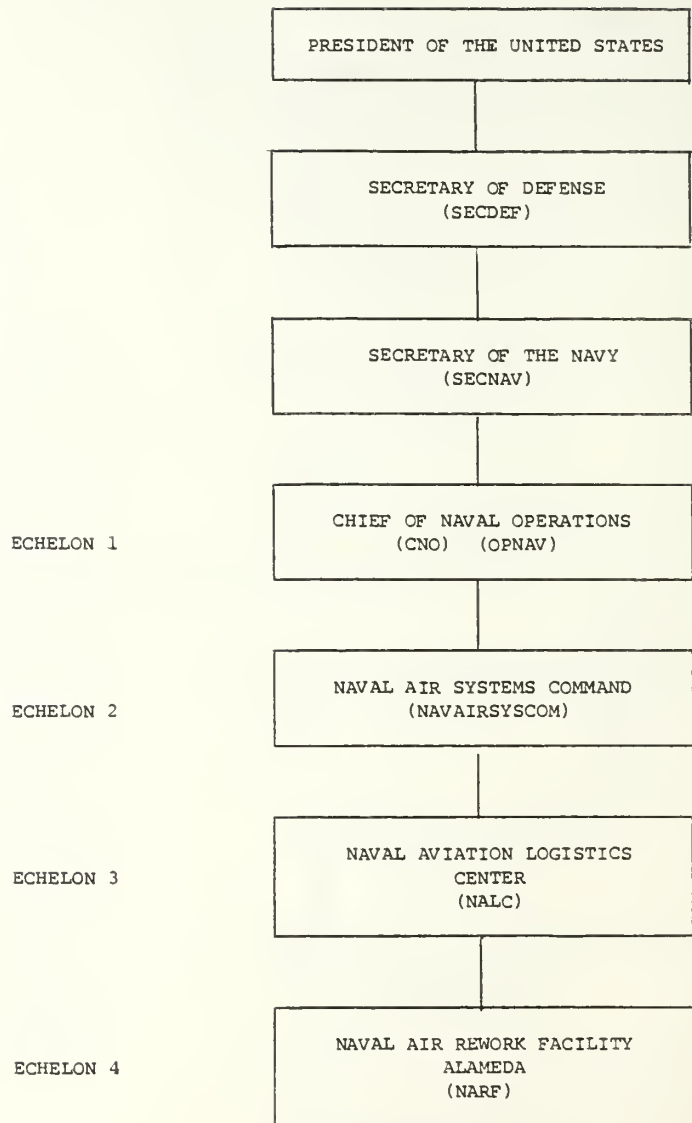


Figure A-3  
Chain of Command NARF Alameda



ORGANIZATION CHART NARF ALAMEDA

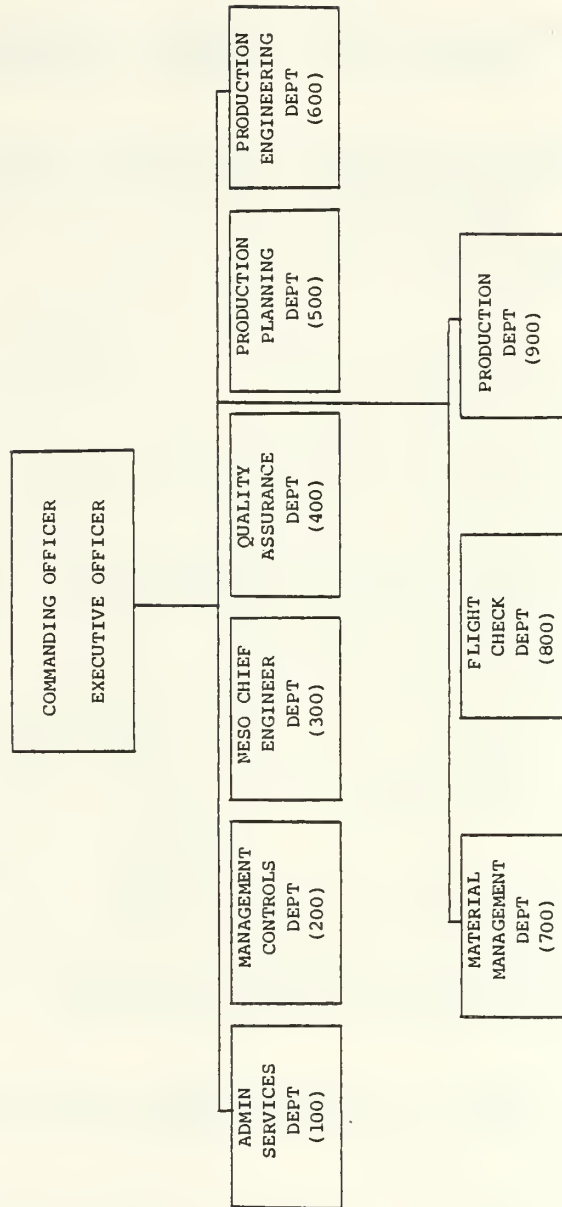


Figure A-4

Organization Chart NARF Alameda

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and the Naval Air Re-  
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An analysis of im-  
pediments to the pro-  
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capital investment  
programs at the Naval  
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